

TO: Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
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In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Southern District of New York on the following

☐ Trademarks or ☒ Patents. (☐ the patent action involves 35 U.S.C. § 292.);

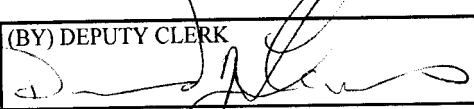
DOCKET NO. 05-7891 (AKH)	DATE FILED 9/9/2005	U.S. DISTRICT COURT Southern District of New York
PLAINTIFF ANVIK CORPORATION		DEFENDANT NIKON PRECISION, INC., ET AL.,
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 See Attached Sheet		See Attached Sheet
2 4,924,257		
3 5,285,236		
4 5,291,240		
5		

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY <input type="checkbox"/> Amendment <input type="checkbox"/> Answer <input type="checkbox"/> Cross Bill <input type="checkbox"/> Other Pleading		
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK	
1 See Attached Sheet		See Attached Sheet	
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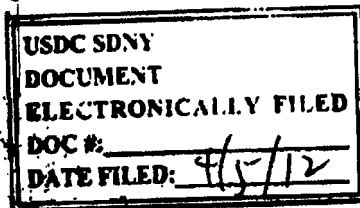
In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT COPY ATTACHED: JUDGMENT

CLERK Ruby J. Krajick	(BY) DEPUTY CLERK 	DATE 4/6/2012
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Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
 Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK



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ANVIK CORPORATION,

Plaintiff,

v.

NIKON PRECISION, INC., et al.,

LG.PHILIPS LCD CO., LTD., et al.,

SAMSUNG ELECTRONICS AMERICA, INC., et al.,

CHI MEI OPTOELECTRONICS, et al.,

AU OPTRONICS CORP., et al.,

SHARP CORP., et al.,

INNOLUX DISPLAY CORP.,

HANNSTAR DISPLAY CORP.,

AFPD PTE LTD., and

IPS ALPHA TECHNOLOGY, LTD, et al.

Defendants.
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Civ. No. 05-7891 (AKH) ←

Civ. No. 07-0816 (AKH)

Civ. No. 07-0818 (AKH)

Civ. No. 07-0821 (AKH)

Civ. No. 07-0822 (AKH)

Civ. No. 07-0825 (AKH)

Civ. No. 07-0826 (AKH)

Civ. No. 07-0827 (AKH)

Civ. No. 07-0828 (AKH)

Civ. No. 08-4036 (AKH)

JUDGMENT

Upon the Court's Order of April 4, 2012 (the "Order"), it is hereby ordered that the above-captioned actions are dismissed upon the following terms:

1. Claims 17 and 18 of U.S. Patent No. 4,924,257 are declared invalid for failure to comply with the requirement that "[t]he specification . . . shall set forth the best mode contemplated by the inventor of carrying out his invention." 35 U.S.C. § 112.

2. Claims 23 and 25 of U.S. Patent 5,285,236 are declared invalid for failure to comply with the requirement that "[t]he specification . . . shall set forth the best mode contemplated by the inventor of carrying out his invention." 35 U.S.C. § 112.

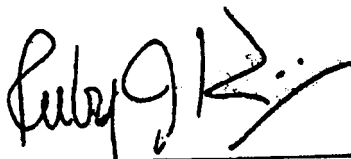
3. Claim 25 of U.S. Patent 5,291,240 is declared invalid for failure to comply with the requirement that "[t]he specification . . . shall set forth the best mode contemplated by the inventor of carrying out his invention." 35 U.S.C. § 112.

4. Plaintiff's Complaint or Amended Complaint, as the case may be, in each of the above-captioned actions is dismissed with prejudice.

5. This is without prejudice to Plaintiff's right to appeal.

6. Defendants' Counterclaims, other than those asserting invalidity of U.S. Patents Nos. 4,924,257, 5,285,236, and 5,291,240 in each of the above-captioned actions, are dismissed without prejudice as moot.

April 5, 2012



CLERK OF COURT

[54] SCAN AND REPEAT HIGH RESOLUTION
PROJECTION LITHOGRAPHY SYSTEM

[76] Inventor: Kantilal Jain, 18 Algonquian Trail,
Briarcliff Manor, N.Y. 10510

[21] Appl. No.: 253,717

[22] Filed: Oct. 5, 1988

[51] Int. Cl.³ G03B 27/42

[52] U.S. Cl. 355/53; 355/77;
250/492.2

[58] Field of Search 355/43, 53, 77;
356/400, 401; 250/548, 442.1, 205, 491.1, 492.2,
492.3

[56] References Cited

U.S. PATENT DOCUMENTS

4,701,608 10/1987 Morita et al. 250/205
4,748,477 5/1988 Isohata et al. 355/53
4,749,867 6/1988 Matsushita et al. 250/442.1
4,825,086 4/1989 Mueller 250/492.2 X

Primary Examiner—L. T. Hix

Assistant Examiner—D. Rutledge

Attorney, Agent, or Firm—Carl Kling

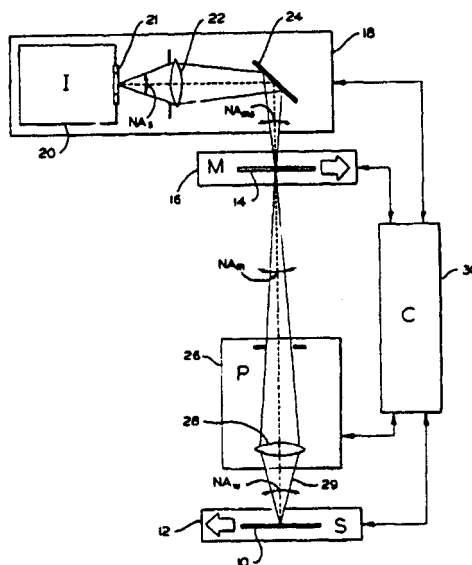
[57]

ABSTRACT

This scan and repeat lithography system has high resolution capability, large effective image field size, and high substrate exposure speed, and comprises: (a) a

substrate stage capable of scanning a substrate in one dimension and, when not scanning in said dimension, capable of moving laterally in a direction perpendicular to the scan direction so as to position the substrate for another scan; the substrate stage exposing the full substrate by breaking up the substrate area into parallel strips, and exposing each of the strips by scanning the length of the strip across a fixed illumination region; (b) a mask stage capable of scanning in the same direction as, and synchronized with, the substrate stage, at a speed faster than the substrate stage scanning speed by a certain ratio M; (c) an illumination subsystem having an effective source plane in the shape of a polygon, and capable of uniformly illuminating a polygon-shaped region on the mask; (d) a projection subsystem having an object-to-image reduction ratio M, and having a polygon-shaped image field of an area smaller than the desired effective image field size of the lithography system; and (e) provision of complementary exposures in an overlap region between the areas exposed by adjacent scans in such a way that a seam in the exposure dose distribution received on the substrate is absent between the scans, and such that the exposure dose delivered across the entire substance is uniform.

22 Claims, 5 Drawing Sheets





US005285236A

United States Patent [19]

Jain

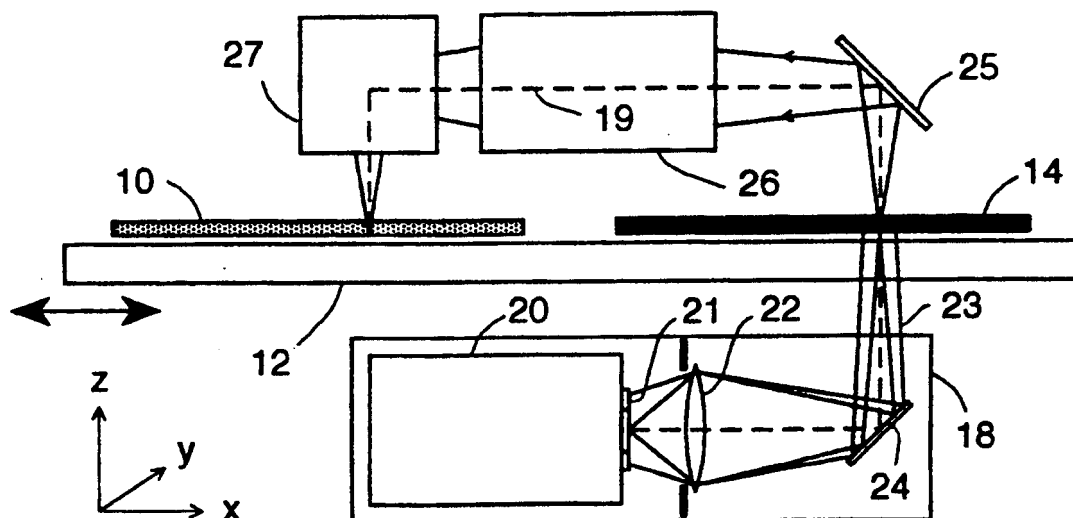
[11] Patent Number: **5,285,236**[45] Date of Patent: **Feb. 8, 1994****[54] LARGE-AREA, HIGH-THROUGHPUT, HIGH-RESOLUTION PROJECTION IMAGING SYSTEM****[76] Inventor:** Kanti Jain, 18 Algonquian Trail, Briarcliff Manor, N.Y. 10510**[21] Appl. No.:** 954,662**[22] Filed:** Sep. 30, 1992**[51] Int. Cl.⁵** G03B 27/53**[52] U.S. Cl.** 355/53; 355/67**[58] Field of Search** 355/53, 66, 67**[56] References Cited****U.S. PATENT DOCUMENTS**

4,891,663	1/1990	Hirose	355/53
4,924,257	5/1990	Jain	355/53
5,168,306	12/1992	Morimoto et al.	355/53
5,227,838	7/1993	Nakanishi et al.	355/53
5,227,839	7/1993	Allen	355/53

Primary Examiner—Michael L. Gellner*Assistant Examiner*—D. P. Malley**[57] ABSTRACT**

This projection imaging system has large-area exposure capability, high exposure throughput, and high resolu-

tion, and comprises: (a) a stage for holding in fixed juxtaposition a mask and a substrate, and capable of scanning in one dimension, and when not scanning in that dimension, capable of moving laterally in a direction perpendicular to the scan direction so as to position itself for another scan, the stage exposing the full substrate by breaking up the substrate area into parallel strips, and exposing each strip by scanning the length of the strip across a fixed illumination region; (b) an illumination system having an effective source plane of a predetermined shape, and capable of illuminating on the mask a region of the above predetermined shape; (c) a projection assembly having an object-to-image magnification ratio of unity, having means to render the image in the same orientation as the object, and having an image field of the above predetermined shape and of an area smaller than the substrate area; and (d) provision for additive illumination in overlap regions of areas exposed by adjacent scans such that the effect of the exposure dose delivered in the overlap regions is seamless and the effect of the exposure dose delivered across the entire substrate is uniform.

28 Claims, 5 Drawing Sheets



US005291240A

United States Patent [19]

[11] Patent Number: 5,291,240

Jain

[45] Date of Patent: Mar. 1, 1994

[54] NONLINEARITY-COMPENSATED
LARGE-AREA PATTERNING SYSTEM

[75] Inventor: Kanti Jain, Briarcliff Manor, N.Y.

[73] Assignee: Anvik Corporation, Elmsford, N.Y.

[21] Appl. No.: 967,189

[22] Filed: Oct. 27, 1992

[51] Int. Cl.³ G03B 27/42

[52] U.S. Cl. 355/53; 355/77

[58] Field of Search 355/50, 51, 53, 77;
250/492.2, 548

[56] References Cited

U.S. PATENT DOCUMENTS

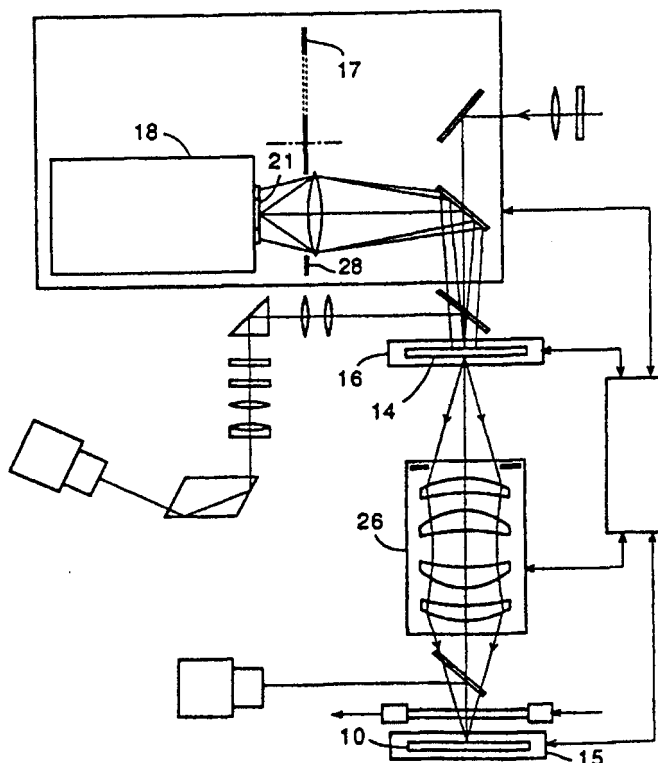
3,819,265	6/1974	Feldman et al.	355/51
4,068,947	1/1978	Buckley et al.	355/72
4,171,870	10/1979	Bruning et al.	350/173
4,302,079	11/1981	White	350/371
4,362,384	12/1982	Engelbrecht et al.	355/71
4,701,608	10/1987	Morita et al.	250/205
4,748,477	5/1988	Ishohata et al.	355/53
4,749,867	6/1988	Matsushita et al.	250/442.1
4,758,091	7/1988	Bodine	356/358
4,778,233	10/1988	Christenson et al.	350/6.6
4,825,086	4/1989	Mueller	250/492.2 X
4,879,605	11/1989	Warkentin et al.	358/296
4,901,109	2/1990	Mitome et al.	355/68
4,924,257	5/1990	Jain	355/53
4,962,318	10/1990	Nishi	250/548
5,227,839	7/1993	Allen	355/53

Primary Examiner—Richard A. Wintercorn
Attorney, Agent, or Firm—Carl C. Kling

[57] ABSTRACT

This patterning system has the ability to uniformly image a mask onto a substrate having nonlinear exposure characteristics, has large-area exposure capability, and comprises: (a) a stage system capable of synchronously scanning a mask and a substrate in one dimension, and when not scanning in that dimension, capable of moving them laterally in a direction perpendicular to the scan direction so as to position the mask and substrate for another scan partially overlapping the preceding scan, thus exposing the full substrate in an overlapping scan-and-repeat fashion; (b) an illumination system capable of illuminating on the mask a region of a predetermined multisided shape which has at least one of its sides curved, the curvatures of said curved sides being so determined that adjacent scanning exposures are compensated in their overlap regions for the nonlinear response characteristics of the substrate so as to provide uniform cumulative response; (c) a projection assembly capable of imaging the illuminated region on the mask onto the substrate, having the desired imaging resolution, and having an image field size smaller than the substrate; and (d) provision for adjusting the widths of the overlap regions of adjacent scans in such a way that the cumulative response over the entire substrate is uniform.

26 Claims, 6 Drawing Sheets



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US005721606A

United States Patent [19]

Jain

[11] Patent Number: 5,721,606
[45] Date of Patent: Feb. 24, 1998

[54] **LARGE-AREA, HIGH-THROUGHPUT, HIGH-RESOLUTION, SCAN-AND-REPEAT, PROJECTION PATTERNING SYSTEM EMPLOYING SUB-FULL MASK**

[76] Inventor: **Kanti Jain**, 18 Algonquian Trail,
Briarcliff Manor, N.Y. 10510

[21] Appl. No.: 524,706

[22] Filed: Sep. 7, 1995

[51] Int. Cl.⁶ H01L 21/027

[52] U.S. Cl. 355/53; 255/77

[58] Field of Search 355/50, 53, 54,
355/55, 60, 72, 75

[56] References Cited

U.S. PATENT DOCUMENTS

4,708,466	11/1987	Isobata et al.	355/53
5,150,152	9/1992	Isobata et al.	355/53
5,285,236	2/1994	Jain	355/53

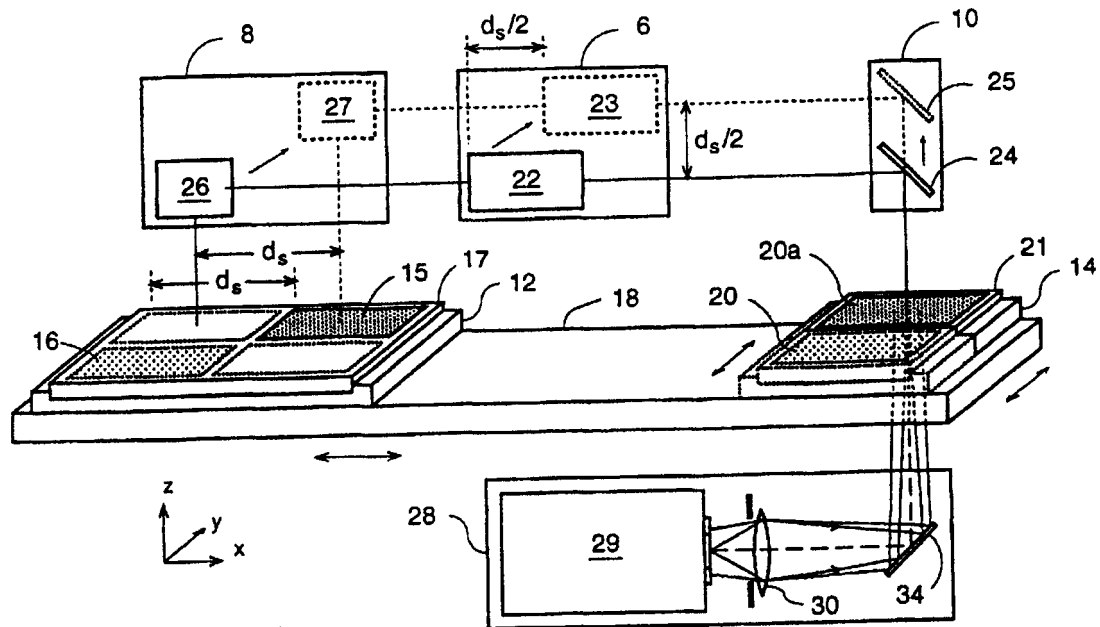
Primary Examiner—John H. Pendegrass
Attorney, Agent, or Firm—Carl C. Kling

[57] ABSTRACT

For high-throughput, low-cost manufacturing of electronic

modules, it is desirable to use a large-format, 1:1-imaging exposure system. In such a system, it is further desirable to have the capability to pattern a large substrate having multiple segments using a mask of the size of one substrate segment. The substrate is mounted on an x-y stage which moves the substrate with respect to the imaging optics, both within a segment and from segment to segment. For each mask position, moving from one substrate segment to another will result in a significant change in the length or orientation of the optical imaging path. Such problems are eliminated by using, in conjunction with the primary x-y stage, an auxiliary stage which maintains the optical parameters essentially constant for the imaging of different substrate segments. The auxiliary stage in a first embodiment is mounted on the primary x-y stage and is deployed to move the mask to compensate for the primary stage motion required to present the subsequent substrate segment at the imaging location and keep the optical parameters constant. In a second embodiment, the auxiliary stage is configured as an optics stage set mounted orthogonally to the x-y stage and moves components of the projection system to present a different substrate segment at the imaging location while keeping the optical imaging parameters constant. A third embodiment employs auxiliary stages for moving both the mask and the projection optics for greater versatility.

22 Claims, 5 Drawing Sheets





US005897986A

United States Patent [19]

Dunn et al.

[11] **Patent Number:** 5,897,986[45] **Date of Patent:** Apr. 27, 1999

[54] **PROJECTION PATTERNING OF LARGE SUBSTRATES USING LIMITED-TRAVEL X-Y STAGE**

[75] **Inventors:** Thomas J. Dunn, Mohegan Lake, N.Y.;
Nestor O. Farmiga, Clifton, N.J.;
Kanti Jain, Briarcliff Manor, N.Y.

[73] **Assignee:** Anvik Corporation, Hawthorne, N.Y.

[21] **Appl. No.:** 08/864,160

[22] **Filed:** May 28, 1997

[51] **Int. Cl.⁶** G03F 7/22

[52] **U.S. Cl.** 430/394; 430/397; 355/77

[58] **Field of Search** 430/394, 396,
430/397; 438/946; 355/77

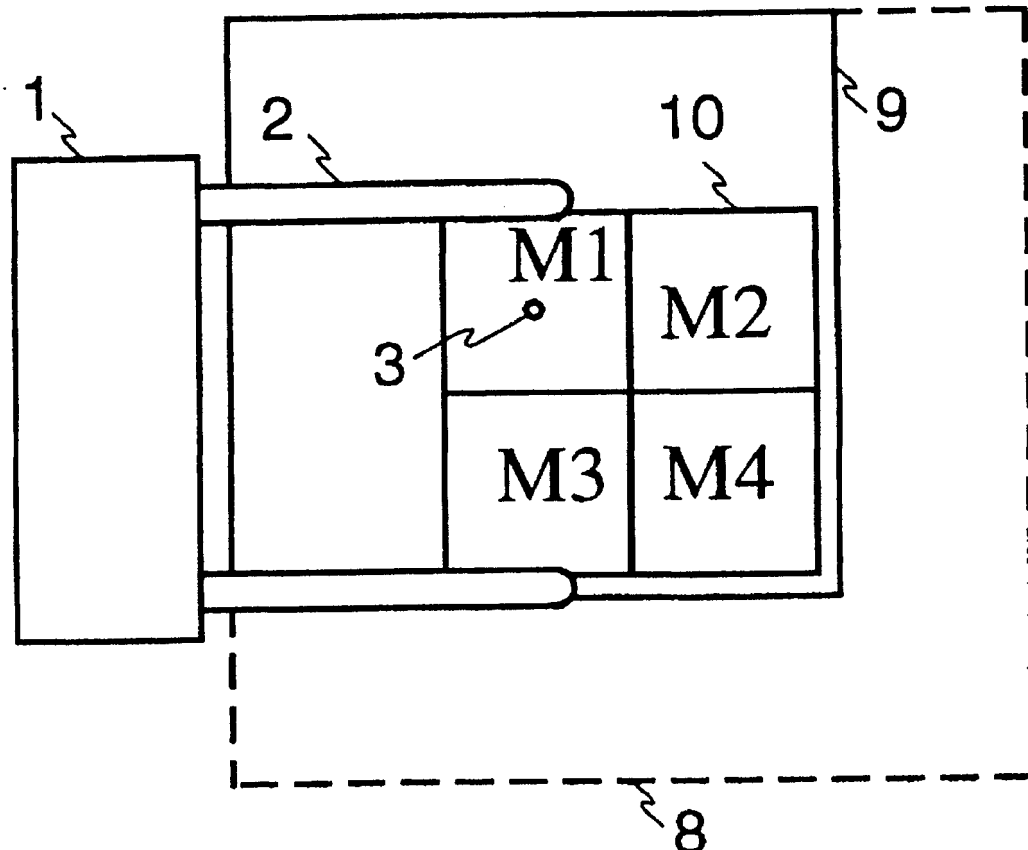
[56] **References Cited****U.S. PATENT DOCUMENTS**

4,775,877 10/1988 Kosugi et al. 355/53
5,285,236 2/1994 Jain 355/53

Primary Examiner—John A. McPherson
Attorney, Agent, or Firm—Carl C. Kling

[57] **ABSTRACT**

A large-format substrate patterning system, for microelectronics manufacturing, utilizes a substrate docking fixture to enable relative motion between the substrate stage and the substrate. This enables exposure of a large-format substrate which has been partitioned into different modules where each module contains an entire pattern transferred from a mask. This projection system enables patterning of a large multi-module substrate using a stage whose range of travel is smaller than the size of the substrate and using a mask whose area is smaller than the size of the substrate. This is accomplished by repositioning the substrate to expose each module sequentially. In order to reposition the substrate, its location is maintained fixed in space by a substrate docking fixture while the movable stage of the lithography system is repositioned to position a different module of the substrate in the image field of the lithography tool. This allows the use of a mask whose size is determined by the size of each substrate module, and the use of a scanning stage whose required range of travel is determined by the size of the substrate module, and not by the size of the entire substrate. This eliminates the size limitation of the substrate from dependence on the range of travel of the stage, and permits the repetitive use of a small mask or series of small masks to produce a composite multi-module pattern on the substrate.

7 Claims, 12 Drawing Sheets



US006201597B1

(12) **United States Patent**
Dunn et al.

(10) **Patent No.:** US 6,201,597 B1
(45) **Date of Patent:** Mar. 13, 2001

(54) **APPARATUS FOR PROJECTION
PATTERNING OF LARGE SUBSTRATES
USING LIMITED-TRAVEL PRECISION X-Y
STAGE**

5,721,608 * 2/1998 Taniguchi 355/53
5,805,866 * 9/1998 Magone et al. 395/500

* cited by examiner

(75) **Inventors:** Thomas J. Dunn, Mohegan Lake, NY
(US); Nestor O. Farniga, Clifton, NJ
(US); Kanti Jain, Briarcliff Manor, NY
(US)

Primary Examiner—Safet Metjahic
Assistant Examiner—Etienne LeRoux
(74) *Attorney, Agent, or Firm*—Carl C. Kling

(73) **Assignee:** Anvik Corporation, Hawthorne, NY
(US)

(*) **Notice:** Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 0 days.

(21) **Appl. No.:** 09/245,700

(22) **Filed:** Feb. 5, 1999

Related U.S. Application Data

(62) Division of application No. 08/864,160, filed on May 28,
1997, now Pat. No. 5,897,986.

(51) **Int. Cl.⁷** G03B 27/42

(52) **U.S. Cl.** 355/53; 355/55

(58) **Field of Search** 355/53, 55

(56) **References Cited**

U.S. PATENT DOCUMENTS

Re. 35,753 * 3/1998 Raab et al. 430/4
4,814,830 * 3/1989 Isohata et al. 355/54
5,103,257 * 4/1992 Wijnaendts Van Resandt 355/53
5,442,418 * 8/1995 Murakami et al. 355/53
5,686,997 * 11/1997 Shirasu 356/401
5,721,606 * 2/1998 Jain 355/53

(57) **ABSTRACT**

A large-format substrate patterning system, for microelectronics manufacturing, utilizes a substrate docking fixture to enable relative motion between the substrate stage and the substrate. This enables exposure of a large-format substrate which has been partitioned into different modules where each module contains an entire pattern transferred from a mask. This projection system enables patterning of a large multi-module substrate using a stage whose range of travel is smaller than the size of the substrate and using a mask whose area is smaller than the size of the substrate. This is accomplished by repositioning the substrate to expose each module sequentially. In order to reposition the substrate, its location is maintained fixed in space by a substrate docking fixture while the movable stage of the lithography system is repositioned to position a different module of the substrate in the image field of the lithography tool. This allows the use of a mask whose size is determined by the size of each substrate module, and the use of a scanning stage whose required range of travel is determined by the size of the substrate module, and not by the size of the entire substrate. This eliminates the size limitation of the substrate from dependence on the range of travel of the stage, and permits the repetitive use of a small mask or series of small masks to produce a composite multi-module pattern on the substrate.

25 Claims, 12 Drawing Sheets

